

Livelihood Goals and Its Impact on Livelihood Strategy in Rural China

Abstract

The livelihood strategy aims to achieve the livelihood goal. The role of the livelihood goal is emphasised in livelihood strategy selection, but no studies have calculated the livelihood goal systematically and explored how livelihood goal influences livelihood strategy selection. This study constructs the livelihood goals' measurements and explores their impact on livelihood strategy. To provide more comprehensive empirical evidence, we classify livelihood strategy into agricultural strategy, non-agricultural strategy, and concurrent business strategy. Using the 2018 Chinese Family Panel Studies data, we use the multinomial logit model to examine the influence of livelihood goals on livelihood strategy selection in rural China. Our result shows three types of livelihood goals, including the survival goal, security goal and self-respect goal, measured by seven indicators. The non-agricultural strategy is the most likely livelihood strategy, followed by the concurrent business strategy. Households with the survival or security goal would most likely choose the concurrent business strategy. In contrast, those whose livelihood goal is self-respect are more likely to adopt a non-agricultural strategy. By promoting households from a low-level to a high-level livelihood status, the government can encourage the households to pursue a higher-income livelihood strategy.

Keywords: livelihood strategy, livelihood goals, factors, rural household, China

JEL Codes: D12, D15, O53, P25, R20

1. Introduction

Agriculture, farmers, and rural areas are the cornerstones of Chinese economic development. According to the World Urbanization prospects in 2018 of the United Nations, the global rural population has reached 3.397 billion in 2019, accounting for 44.29% of the world's total population. However, the data from China's National Bureau of Statistics shows only 28.86% of rural residents worked in the agricultural sector in 2018. With the implementation of the Rural Revitalization Strategy policy and urbanisation, rural households' livelihood strategy (LS)¹ becomes more diversified. Understanding the factors that affect LS choice is the key to improving households' livelihood. LS indicates the living conditions of rural households and households' asset allocation decisions under limited structural constraints and how households change their allocation strategy to adapt or cope with changing environment (De Haan & Zoomers, 2005; Wu et al., 2022). LS approaches to promote household development focus on empowering, emphasising what households have rather than lack (Tambe, 2022).

Previous studies focused on the factors influencing LS selection, such as natural factors, macroeconomic factors, and livelihood assets (e.g., Hua et al., 2017; Liang et al., 2022). In rural households' welfare, scholars explore the influence of natural disasters and shocks on LS selection and LS transition (Démurger & Xu, 2011; Musumba et al., 2022). For example, Musumba et al. (2022) analyse the shocks in LS diversification in rural Africa and discover that drought lowers LS's diversity. In addition to the natural shocks, many studies analyse the effects of the economic and cultural factors in LS selection (Neef et al., 2018; Helmy, 2020). For example, Neef et al. (2018) analyse the relationship between social norms, cultural values and climate adaption LS in Fiji, and reveal the complicated role of local power relations, attachment to cultural and social space, and the provision of external assistance. Helmy (2020) focuses on the influence of wealth and the urban-rural divide on the LS revolution in Egypt and find that poor rural household depends more on informal LS and exhibit higher diversification.

At the micro-level, most of the studies focus on the influence of livelihood assets on LS selection and indicate the positive effects of livelihood assets on LS selection. For example, Kuang et al. (2019) find livelihood assets, including natural, social capital and human assets, have positive impacts on rural households' adaptation strategy. Huang et al. (2021b) analyse the capital endowments in LS selection in Sa Pa, Vietnam. They find financial capital is the key to promoting tourism livelihood but impede agricultural household from participating in other livelihood activities. Zhang et al. (2022) find that households who rely heavily on rice growing, compared to off-farm enterprises, have more physical

¹ LS (Livelihood strategy) refers to the behaviour pattern adopted by the household for asset allocation to achieve their livelihood goals.

assets and higher unit yield but with lower income in Poyang Lake Plain, China.

Recent studies shed light on the specific characteristic of households and household heads in LS selection (Liu & Liu, 2016; Xu et al., 2020; Hackman & Kramer, 2021). For example, Zhang et al. (2019) discover that land endowment, land renting-in and land expropriation negatively affect rural households' upward mobility in LS in rural China. Xu et al. (2020) and Hackman and Kramer (2021) analyse the family life cycle stage in LS selection. The former reveals that rural households in maintenance states have the highest agricultural income from the most extensive land management area, positively influencing their LS selection. The latter part of the study employs household sizes as the proxy for the lifecycle and finds household size positively influences livelihood diversity. In addition, the paper also explores the household heads' features. For example, Liu and Liu (2016) discover that personal perceptions and household attitudes positively influence LS decisions in China. Liang et al. (2022) explore household head's risk expectations in LS choices and find that farmers' livelihoods and risk expectations exhibit inconsistent effects on LS choices on homestead withdrawal policy.

However, livelihood goal (LG)², the main base for families to allocate livelihood assets (Gordon et al., 2001; Start & Johnson, 2004; He et al., 2013), has not explored how LG influences LS selection. Previous studies emphasise LG as the orientation of LS selection and implementation (e.g., He et al., 2013; Asfir, 2016). However, how and to what extent LG affect rural households' LS selection needs more empirical evidence.

This paper examines the impact of LG on LS selection in rural China based on the 4232 household-level data in rural China. This study contributes to the literature in twofolds. First, following the previous studies, we develop the measurement of LG based on the key indicators of LG following four steps: literature review, Principal Component Analysis (PCA), Multinomial Logit (MNL) model and entropy weighting method. Second, we further test our measures of LG by examining their influence on LS selection. This study is the first study to use an empirical method to explore the effect of LG in LS selection.

The paper is organised as follows. Section 2 presents the literature review on LS and LG. Data collection and empirical model are discussed in Section 3. Section 4 presents the empirical results, and Section 5 concludes the paper.

2. Literature Review

2.1 Renew the Sustainable Livelihood Framework

² LG (livelihood goal) refers to the observable and measurable goals that households want to realize during their LS implementation based on their living condition.

The role of LG is emphasised in the livelihood field. LS is a process where households integrate various activities at different times to meet their LG (DFID, 1999; He et al., 2013; Asfir, 2016). When the livelihood goal or expectation is clear, all else will follow (Morse et al., 2009). Based on this view, LG plays a decisive role in LS selection. However, past researches do not systematically conclude the connotation and classification of LG, and no study has empirically explored its influences on LS selection. For example, previous studies indicate that the goals of implementing household strategy are to diversify risk and protect well-being (Whitehead, 2002), improve income (Démurger et al., 2010), increase social class (Wu et al., 2019), and reduce vulnerability (Helmy, 2020). These so-called goals are consistent with the livelihood outcomes in the sustainable livelihood framework put forward by DFID (1999). However, outcomes differ from goals (Gordon et al., 2001). Goals affect outcomes because goal-directed behaviour regulates processes (Ford, 1992; Lee & Hanna, 2015). Specifically, a household's LG can be viewed as the reason or the purpose that the household implements LS.

There are different types of LG from different perspectives. Chambers et al. (1989) put forward the LG and its classification first in 1989 from the perspective of demand and behaviour. In their seminal research, they identify three LG, including survival goal, security goal, and self-respect goal, which are based on stable subsistence, assets and rights, and independence and choice, respectively. Based on Chambers et al.'s study, Gordon et al. (2001) illustrate how these three goals guide households to adopt coping strategies to protect their livelihoods using a case study in Anantapur, Udaipur in India. Ellis (1992) puts forward three farmers' critical objectives from the perspective of motivations and behaviours, including drudgery aversion, risk mitigation and profit-maximisation. Under different goals, households' utility maximisation would be realised under various constraints. Likewise, Deng (2006) summarises three kinds of farmers and corresponding goals from the utility maximisation perspective. The first is survival farmers, who seek survival maximisation. The farmer's goal is the same as the LG of drudgery aversion by Ellis (1992) and Chayanov (1996). The second is socialised farmers, whose goal is to realise income maximisation. Deng (2006) puts forward this type of farmer based on the Chinese farmers' living conditions, who have stronger motivation to maximise their income because of the increasing monetary expenditure pressure. The third type is rational farmers who pursue profit maximisation, based on the idea of Schultz (1956).

From the essence of goal, LG is the observable and measurable goals that are supposed to realise through LS implementation. From this perspective, LG reflects households' demand, and LS is the corresponding behaviour to reach the goal. Therefore, following the seminal idea of Chambers (1989) and Gordon et al. (2001), we classify LG as the survival goal, the security goal and the self-respect goal. Those three goals are consistent with Maslow's (1954) Hierarchical Theory of Human Needs. The survival goal corresponds to physiological needs, while the security goal corresponds to safety needs. The self-respect goal fits love and social belonging, and esteem needs. Different LS will be generated

based on different LG, and the LG could also change with their LS and the surrounding circumstances (Gordon et al., 2001). Goal setting intensifies the motivation for achievement, affecting both the productivity and satisfaction of goal holders (Gómez-Miñambres, 2012). Once the low-level LG is achieved, people next pursue the higher level of LG (Gordon et al., 2001; Deng, 2006).

Those studies evaluate LG adapted from the sustainable livelihood framework (SLF) (DFID 1999). SLF is considered an analytical structure to control the complexity of livelihood based on the LS that people pursue (De Haan, 2012). Based on the literature, LS selection is decided by LG. Therefore, this study improves the previous SLF and proposes the renewable SLF (see Figure 1). Figure 1 shows LG is determined by livelihood assets and external factors, which determines the LS selection with livelihood assets and external factors.

2.2 Indicators of Livelihood Goals

According to Chambers (1989) and Gordon et al. (2001), the survival goal is based on stable subsistence, including the desire of households to the sound and sufficient basic living needs, such as food, clothing, shelter, etc. The subsistence households have limited access to finance, using low inputs and traditional methods in farming to eke out a livelihood (Tambe, 2022). Those households are always vulnerable, poor and struggle for subsistence (Chambers, 1995; Kundu & Das, 2021). If a household's income is lower than the poverty line, this family is in a low state of living conditions and pursues the survival goal. Engel's law suggests the share of food expenditure in total expenditure declines as income rises. The poorer a family, the greater the proportion of total spending on food (Yu, 2018). Therefore, the Engel coefficient is considered one of the indicators of the survival goal. Previous studies also find that autarky households are self-sufficient, neither sold nor purchased from the market (Mottaleb, 2018), and have low-level income and poor living conditions (Xu & Du, 2022). Therefore, the self-sufficient level is also considered one of the indicators of the survival goal. From the perspective of stability, stability comes from the ability to resist risks, shocks and contingency. To enhance the stability of subsistence, spreading risks, smoothing consumption, and preparing for insurance substitutes are the most critical tasks (Ibrahim, 2022). Generally, diversification is the primary coping strategy to widen the subsistence option for an uncertain environment (Dzanku, 2018). Previous studies illustrate that lower-income households have a higher diversification index than higher-income households (Djido & Shiferaw, 2018). The diversification index assesses the households' concern for the survival goal under unexpected external events. Thus, four potential indicators can be used to reflect the level of survival goal, including the income level, food consumption rate, self-agriculture consumption rate, and income diversification index (see Table 1).

When a household realises stable and sufficient subsistence, they upgrade their livelihood goal from the survival goal to the security goal. At the survival goal stage, families would likely deplete assets to support their subsistence. However, when they turn to the security goal, accumulating assets

is the main task to realise a more perpetuate livelihood (Start & Johnson, 2004; Gebru et al., 2018; Tambe, 2022). Poor initial asset endowments not only limit the households' capability to cope with the downside risk but also restrict households involved in high-risk activities from getting a higher return (Mendola, 2007). Therefore, accumulated assets are the most crucial factor in realising the security goal. Those assets are easy to sell, divisible, and secure against price fluctuation, including land, shelter and cash savings (Start and Johnson, 2004). From this perspective, we consider the level of land assets, agricultural production fixed assets, durable assets, house assets, and saving as the indicators to reflect the level of security goal (see Table 1).

After realising the security goal, households will pursue the self-respect goal. From the works of Chambers (1989) and Gordon et al. (2001), the self-respect goal is based on independence and choices, which reflect the self-confidence and esteem in coping and adapting to the potential threats and opportunities (Start & Johnson, 2004). Unlike the security goal, the intangible social capital is the most emphasised asset influencing the self-respect goal (Gordon et al., 2001). Families with access to social capital have a more robust living capability (Bebbington, 1999; Tambe, 2022). Households can get benefits from the homogeneous or heterogeneous social relations in different community groups because social capital is limited by membership (Start & Johnson, 2004). Therefore, social capital is the leading indicator of self-respect goal. Following previous studies, we use the organisation participation and the spending on social activities to reflect the social capital level of a household (Zhang et al., 2019). Because self-respect is a subjective perception, self-reported social status could be one of the potential indicators of self-respect goal. In addition, self-confidence and esteem also come from the coping and adapting capability to the potential threats and opportunities, which depends on households' livelihood assets. Compared to the tangible physical assets accumulated at the security goal stage, at the self-respect goal stage, families could accumulate more financial assets, such as the investment in the funds, stocks and bonds (Xu et al., 2020). These assets reflect households' disposable assets except for living demands. Self-respect also comes from the decision-making capability (Gordon et al., 2001). Compared to wage employment, business assets reflect the decision-making ability and potential revenue from the business (Vial & Hanoteau, 2015). Higher business assets can improve households' self-perceived well-being than those who work for others (Tambe, 2022) and help families move to high remunerate LS (Walelign et al., 2017). Therefore, business assets are another critical indicator of self-respect goal. Another critical intangible factor in influencing households' independence and choices is human capital. Human capital not only affects the household livelihood choice (Kuang et al., 2019) but also influences occupational choice (Wang et al., 2016). At the survival goal stage, the labor force affects survival maximisation (Chayanov, 1996). At the self-respect stage, education level, which indicates the capability of a household (Morse, 2009), plays a more critical role in LS selection. Therefore, a household investing higher in education has a stronger ability to realise

the higher livelihood goal. Overall, organisation participation, social spending, self-reported social status, finance assets, business assets, and average education level are the potential indicators of the security goal (see Table 1).

3. Data, Methods and Descriptive Statistics

3.1 Data

The data is obtained from the Chinese Family Panel Studies (CFPS). CFPS is a nationally representative, biennial longitudinal survey of Chinese communities, families, and individuals launched in 2010 by the Institute of Social Science Survey (ISSS) of Peking University, China. The dataset covers 25 provinces, cities, and autonomous regions, consisting of four datasets: children, adults, household economic conditions, and household demographic conditions. The adult dataset covers the individual health condition, education, work and migration experience, while the household economic dataset includes household economic activity, income and expenditure, household assets, regional location, etc. Using the secondary national data, we can minimise the post hoc rationalisation of the indicators of LG.

First, we merge the adult and household datasets based on the respondent's ID. Next, we classify the household's LS in 2016 and combined it with the dataset from the first step. Third, 2353 observations with missing values are dropped from the 6585 rural observations. Finally, we have 4232 completed rural samples for our study.

3.2 Methods

3.2.1 Assessment Method of Livelihood Goals

There is no research to measure LG except for some related descriptions in the previous studies. To explore the role of LG in LS selection, we follow the studies of Liu et al. (2020), Matter et al. (2021) and Zhou et al. (2021), who construct the measurement of livelihood resilience and then explore its role in LS selection. There are four steps to calculate LG in our study (see Figure 2).

First, to estimate LG, an unobserved factor, we extract the potential indicators that can be observed from the description for each kind of LG. We refer to the seminal studies of Ellis (1992), Chambers (1989; 1995), Gordon et al. (2001), Start and Johnson (2004), Mendola (2005) and Deng (2006) to extract the potential indicators from the description of LG. Based on the results, Kaiser-Meyer-Olkin (KMO) test is used for each type of LG. The KMO tests the likelihood of the data yielding distinct components. Indicators with KMO values below 0.5 are dropped.

Second, to improve the validity of those indicators, we use Principal Component Analysis (PCA) to screen the indicators of each kind of LG. The indicators will be selected if they satisfy (1) the cumulative explanation of those indicators that are more than 50%, and (2) the loading value after rotation of each indicator is more than 0.5 (see Table 2). Variable elimination affects the component structure and

variable composition. Therefore, the preliminary and PCA assessment process have to be reiterated until subsequent results show no further improvement.

Thirdly, we use the multinomial logit (MNL) model to regress the screened indicators with LS to identify the final indicators of each kind of LG.

Finally, we use the entropy weighting method to measure the variable with multiple indices (Wang et al., 2016; Huang et al., 2021b) to calculate the value of each type of LG in each household.

3.2.2 Livelihood Strategy Selection Model

LS selection has great diversity in terms of time, space and families (Ellis, 1998; Barrett et al., 2001). To deconstruct this differentiation, it is necessary to explore the LS classification. This study classifies LS by clustering different incomes from various income-generating activities because it can reflect household asset allocation (Nielsen et al., 2013). Consistent with the previous studies (Yang et al., 2018; Liu et al., 2020; Zhou et al., 2021), we classify LS into the agricultural strategy, non-agricultural strategy and concurrent business strategy based on the baseline of 75%.

The MNL model is a common method for analysing dependent variables with more than two disordered choices, especially when the households can only choose one option within mutually exclusive options. It is the most common method to analyse LS selection factors (Huang et al., 2021b). The MNL model for household i with attributes X_{ij} choose LS j is given as:

$$\text{logit } Y_{ij} = \alpha + \beta_j X_{ij} + Z_i + \varepsilon, j = 0, 1, 2, \dots, n$$

Where α represents the assessed parameters of the model, β_j is the covariate effect of j_{th} LS. The error term ε follows a standard bivariate normal distribution with zero means. X_{ij} refers to the indicators of survival goal, security goal and self-respect goal of household i with LS j . Z_i is the demographic characteristics of household i , including the factors at the household head's and household levels. The former includes the household head's age, gender, education level, health condition, and marital status, and the latter has family size, dependent ratio, land status and the locations.

3.3 Descriptive Statistics

The LS distribution reflects that the non-agricultural strategy is the majority of the LS in rural China (58.34%), followed by the concurrent business strategy (38.56%). In this study, the concurrent business strategy refers to households engaging in more than one livelihood activity with no dominant activities for their livelihood. However, only 2.61% of households choose the agricultural strategy. To rank the three LS, we graphed the three LS by the cumulative probability per capita income (see Figure 3). Compared to other LS, the local non-agricultural strategy is the dominant strategy with the highest income-generated strategy. However, the concurrent business strategy has a stronger potential to

accumulate higher income.

Combining the types of LS and livelihood assets, we find that Chinese rural households' livelihood assets are extremely unbalanced (see Figure 4). From Figure 4, it is apparent that Chinese rural households have unbalanced livelihood assets distribution. They have abundant human assets but short natural, physical, financial and social assets. Regarding the endowment assets of different types of LS, we find that the livelihood assets distribution between different LS is similar, except for the agricultural strategy, which has higher natural assets. In addition, the households that have their own business have higher financial and physical assets, while the households that work locally for non-agricultural jobs have slightly higher human assets.

4. Results and discussions

4.1 Indicators of Livelihood Goals

The data is analysed by StataBE 17.0 software. The operational principle determines the number of principal components, where the eigenvalue is greater than one, and the cumulative proportion is maximised. In Table 2, the factor loading value after rotation of the principal components represents the correlation coefficients between the key variables and the main components. Finally, for the survival goal, two components were extracted to reflect 53.87% of the original information, including four indicators (Kaiser-Meyer-Olkin (KMO) = 0.507, VIF=1). For the security goal, two components composed by five indicators were extracted, which reflects 52.62% of the original information (KMO value is 0.586, VIF=1.10). As for the self-security goal, three indicators are included in two components, which reflect 59.48% of the original information (KMO=0.601, VIF=1.09) (see Table 2).

Robust estimate results of MNL and multinomial probit models reflect the final used factor in constructing the LG. Based on the results, income level, diversification index, and self-agriculture consumption rate are important factors affecting the survival goal. Land and house assets can reflect a household's security goal level. The household's average education level, financial assets and business assets indicate the household's ambition to obtain self-respect goal.

4.2 Impact of Livelihood Goals on Livelihood Strategy

To better understand the estimated result, this study calculates the marginal effects of the coefficients. First, based on the screened indicators of LG in section 4.1, we calculate the marginal effect to analyse the effectiveness of each indicator of LG on LS selection (see Table 3). Next, we use the entropy weighting method to calculate the value of each LG, analyse the MNL model and calculate the marginal effect of each type of LG on different LS to observe the holistic impact of LG on LS selection (see Table 4).

At the survival goal stage, obtaining sustainable subsistence is the first point. Table 3 shows the income level, diversification index, and self-agriculture consumption proportion are the critical

indicators of the survival goal. Specifically, if a household's income is under the poverty line, the probability of choosing the concurrent business strategy increases by 3.4%. If the diversification index increases by 1%, the probability of selecting the concurrent business strategy increase by 52%. However, compared to the concurrent business strategy, households incline to choose the non-agricultural strategy with 1% additional self-agriculture consumption. The likely reason is that expanding LS from agriculture to low-wage or unskilled non-agricultural work can help the households to supplement their income (Brown et al., 2006).

When households realise the survival goal, their goal will upgrade to the security goal. Security comes from a stable higher assets accumulation (Gebru et al., 2018; Tambe, 2022). Table 3 shows the households who pursue the security goal prefer to accumulate land and house assets. Different asset accumulation encourages families to choose other LS - higher land assets stimulate households to determine the concurrent business strategy. In contrast, house assets support households in choosing the non-agricultural strategy. Specifically, with 100,000 additional land assets, the probability of selecting the concurrent business strategy increases by 7.2%. For the farmers, the land is the root and the critical bond between migrant workers and their hometowns (Quinn & Halfacre, 2014). The land also has a role as a safety net, which can help to maintain food security (Nguyen et al., 2020), and supports rural residents going outside to find more opportunities (Wang et al., 2020). Therefore, the marginal effect of land assets on concurrent business strategy is higher than the agricultural strategy. Households can accumulate land assets by obtaining land contracting (Wang et al., 2020) or getting more land tenure rights or land use rights (Xu & Du, 2022). In comparison, the probability of choosing the non-agricultural strategy increases by 3.2% with additional 1 million house assets. For most low-income and working-class households, residential stability is critical to realising the security goal (Shi et al., 2016). In fast-developing China, purchasing a house in the city is the primary means to maintain or increase the value of assets. Therefore, when households can satisfy their survival demand, accumulating land and house assets is one principal approach to realising security goals.

Self-respect goal is the highest level of livelihood goal. Under the self-respect goal, households choose LS based on their preference for livelihood rather than the demand for survival or accumulating assets. Average education level and business assets reflect the level of self-respect goal. With one additional year of the education level of a household, the probability of choosing the non-agricultural strategy increase by 1.8% (see Table 3). Education level reflects the knowledge and skills of family members. Therefore, a higher education level empowers households with higher freedom to choose the living activities they prefer (Bebbington, 1999; Kundu & Das, 2021).

Similarly, business assets have the same effect. For households with businesses, they have higher ability and skills to take care of their assets and generate incomes (Tambe, 2022). Compared to other LS, the non-agricultural strategy has the highest return. The probability of choosing the non-

agricultural strategy increases by 1.5% with an additional 10,000 yuan business assets accumulation (see Table 3). Surprisingly, social assets, including the self-reported social status in the local area, organisation participation, and social spending, do not significantly affect LS selection. The possible reason is that this study only measures regional social capital. However, for the households at the self-respect stage, their social capital could involve a more extensive space rather than be limited to the local area. Families with solid regional social capital could experience social capital deficits in the city (Lu et al., 2013). Furthermore, social capital is always the informal mechanism to deal with unexpected events (Start, Johnson, 2004), and only when the social capital is strong enough, it can help LS selection.

Table 4 shows the integrated result of LG on LS selection. From Table 4, for the households who struggle in maximising survival and security, their overall tendency is to choose the concurrent business strategy. When families have a 1% higher probability of pursuing the security goal, the probability of selecting the concurrent business strategy increases by 53.3%; when the households have a 1% higher probability of pursuing the security goal, the probability of choosing the concurrent business strategy rises by 22.9%. Concurrent business strategy diversifies households' labor force into agricultural and non-agricultural livelihood activities, enabling households to achieve an optimal balance between expected returns and risk exposure to the constraints they face (Barrett et al., 2001; Dilruba & Roy, 2012).

Generally, agricultural livelihood activities are the safety net for the family (Wang et al., 2020). Comparably, the non-agricultural work is the critical approach to resisting the unpredicted shocks (such as the flood, drought, or the extreme weather) (Nguyen et al., 2022), enhancing the opportunity of getting more helpful information, and improving income (Ding & Abdulai, 2020). It explains the typical phenomenon in rural China, where the young labor force leaves their hometown to work in the non-agricultural sector to obtain higher income, whilst the women, the older people and children stay in their hometown to do agricultural work (Chen & Zhao, 2017).

Compared to survival goal-oriented households, although the concurrent business strategy is the primary choice of the security goal-oriented households, the livelihood diversification index of the former (mean score of 0.22) is significantly lower than the latter (mean score of 0.39). This difference implies that under the asset accumulation goal, households emphasise the quality rather than the number of livelihood activities, which encourages them to allocate the limited resources and assets in the higher return livelihood activities rather than engage in many works (Djido & Shiferaw, 2018). Under the self-respected goal, the non-agricultural strategy is the most common selected strategy. When households have a 1% higher probability of pursuing the self-respect goal, the likelihood of choosing the non-agricultural strategy increases by 28.9% (see Table 4). The return of the non-agricultural strategy (mean score of 62127.79 yuan) is much higher than the agricultural strategy (mean score of 34210.36 yuan) and concurrent business strategy (mean score of 38419.23 yuan).

When households realise their security goal, they could upgrade their LG with LS - improve their LS from the concurrent business strategy to the non-agricultural strategy.

4.3 Robust Test

To further test the robustness of the effect of LG on LS selection, we conduct four robust tests. First, we change the measurement of LS. Previous studies classify LS into agricultural strategy, non-agricultural strategy, and concurrent business strategy based on family income (e.g., Yang et al., 2018; Cai et al., 2019). To avoid bias in LS classification, this study reclassifies LS as agricultural strategy, non-agricultural strategy, concurrent business strategy, and supported strategy. The supported strategy means the households survive with the money from the government, children, relatives, or friends. The MNL result shows that LG has the same effect on LS selection.

Second, considering the importance of the household head in LS selection, LS selection could rely on the household head's current job position (Jacobs & Makaudze, 2012). Following the classification LS, we classify the household head's work as agricultural work, private business, wage job, local casual work, and unemployment. The result shows that household heads' current job positions influence LS selection significantly. After adding these potential omitted variables, LG is still significant to LS selection and has the same influence on LS selection.

Finally, the unbalanced sample distribution in different types of LS could lead to biased results and the potential heteroscedastic problem. Therefore, we use the Bootstrap in 200 replication to ensure that each kind of LS has sufficient samples and to avoid the heteroscedastic problem (Zhang et al., 2018; Ding & Abdulai, 2020). Our result is still robust.

5. Conclusions

Previous studies have focused on the impact of natural factors, macroeconomic factors, and livelihood assets (e.g., Hua et al., 2017; Liang et al., 2022). However, no study analyses how LG affects LS selection and its influences on LS selection. This study empirically addresses the linkage between LG and LS. It uses an empirical approach to explore the critical indicators of LG affecting LS selection based on the household level data in rural China. Scholars such as Chambers (1989), Gordon et al. (2001), Start and Johnson (2004), Mendola (2005), Deng (2006), and Morse et al. (2009) have identified the importance of LG in LS selection and put forward the possible classification of LG. Our study adds value to existing research by offering a quantitative approach for evaluating LG and exploring the relationship between LG and LS selection from Chinese rural households.

This study identifies indicators in three dimensions, namely, survival goal, security goal, and self-respect goal, which can be reflected by three, two, and two factors, respectively. These factors critically influence LS selection. Specifically, income level, food consumption rate and self-agricultural consumption rate can reflect the survival goal level of a household. Security goal occurs when families

realise the survival goal, which is characterised by accumulating tangible assets. Assets accumulation in land and house influence the LS selection. When households pursue the survival goal or security goal, they are more likely to choose the concurrent business strategy. Self-respect goal is the highest LG, based on independence and choices. The average education level and business assets influence households' LS selection. A family with a higher self-respect goal level is more likely to choose the non-agricultural strategy.

Our findings have important policy implications for improving the living condition of Chinese rural households. Specifically, the government can encourage families to lower the indicators of the survival goal but improve the value of the security goal and self-respect goal, which helps to increase their LG to attain a more sustainable livelihood. For example, the government can support households to improve their LG to a higher level to get a higher return by motivating households to allocate their limited assets to some livelihood activities with higher revenue, such as engaging in migrant work.

As with any empirical study, there are limitations. First, the measurement of LG is from the ex-post perspective, which assumes households have realised their LG. Given the importance of LG in LS selection, future studies could improve the measurement of LG by combining the data from the field survey. Furthermore, this study is conducted with cross-section data. Future research could use panel data to test the indicators of LG and their impact on LS to obtain more robust results.

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Figures

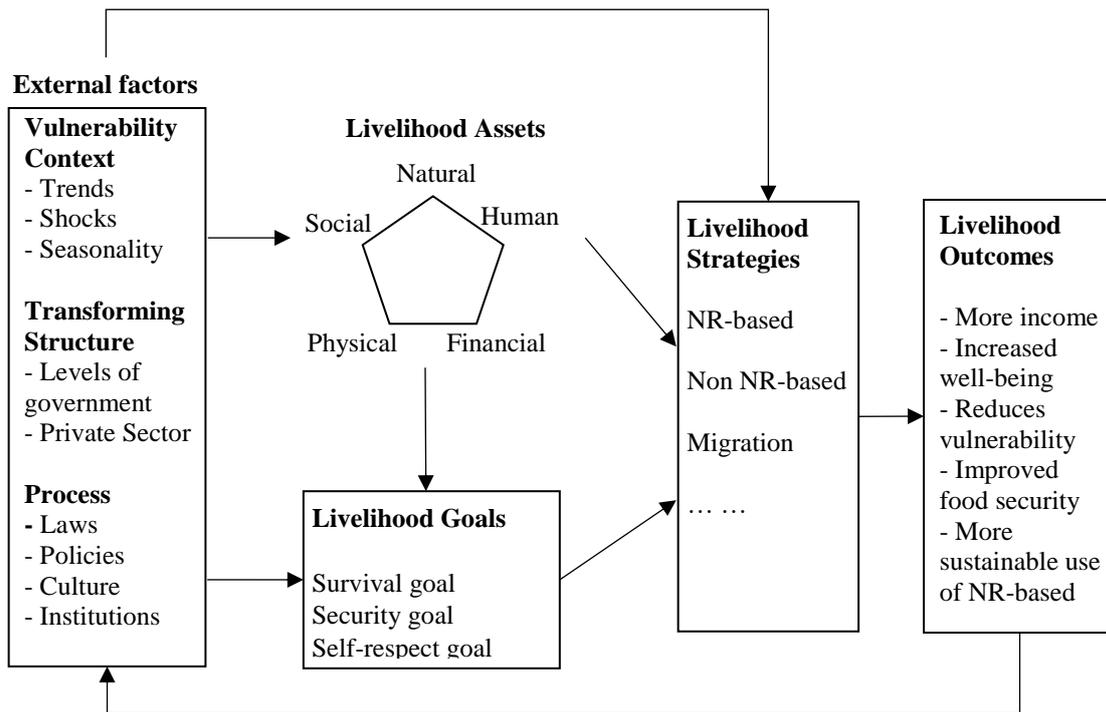


Figure 1. Renewable Sustainable Livelihoods Framework

Source: Adapted from Carney (1998).

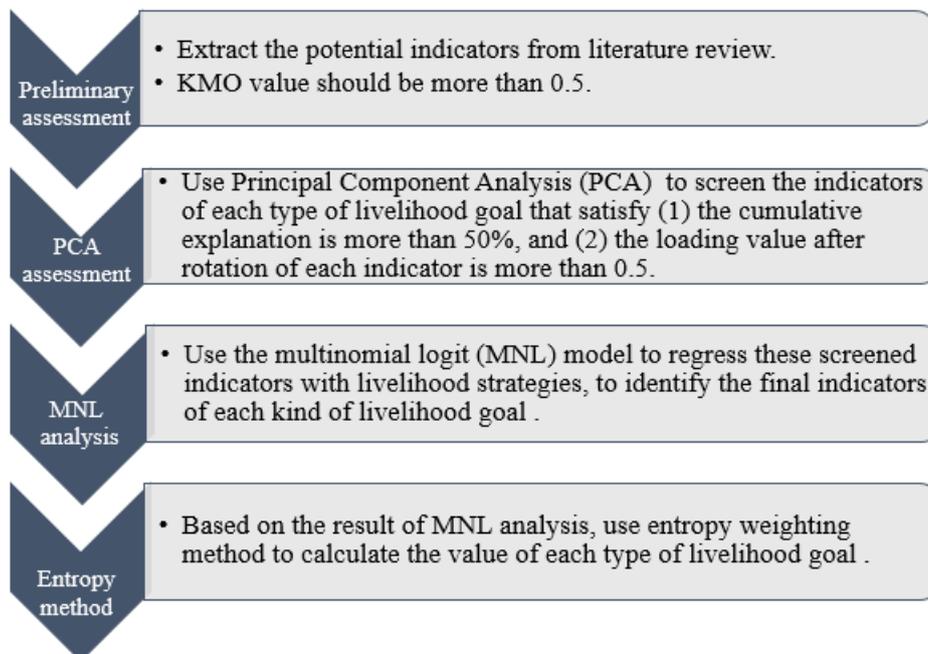


Figure 2. The assessment process of livelihood goals

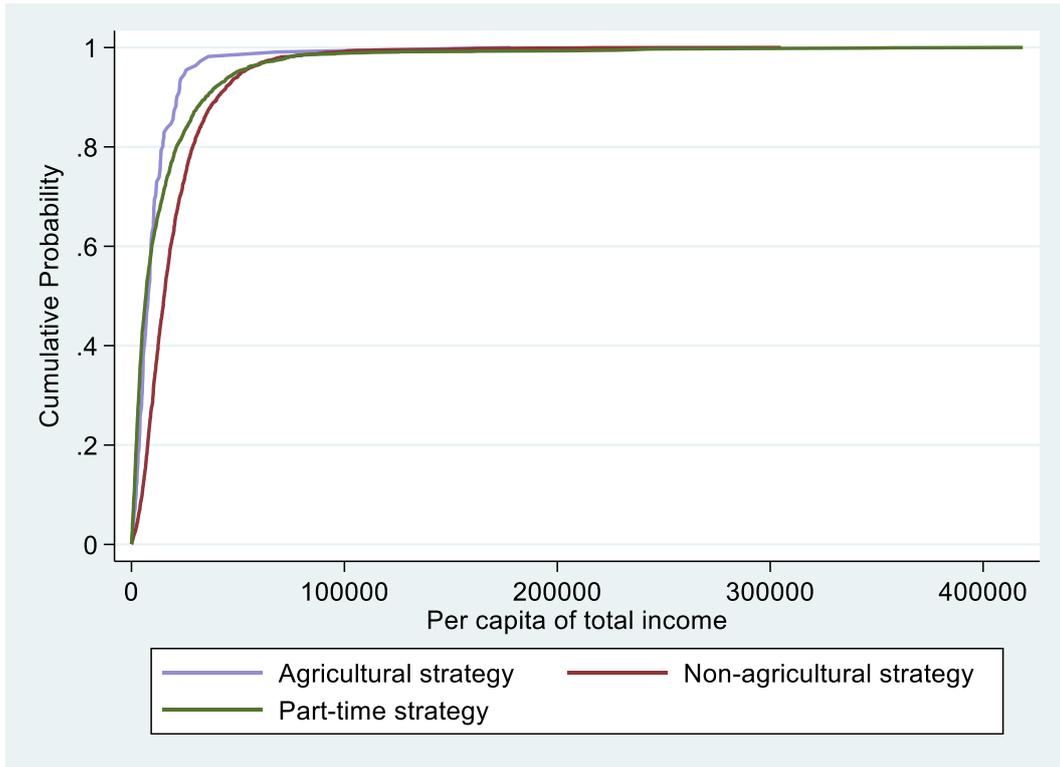


Figure 3. The cumulative probability of per capita family income by livelihood strategy

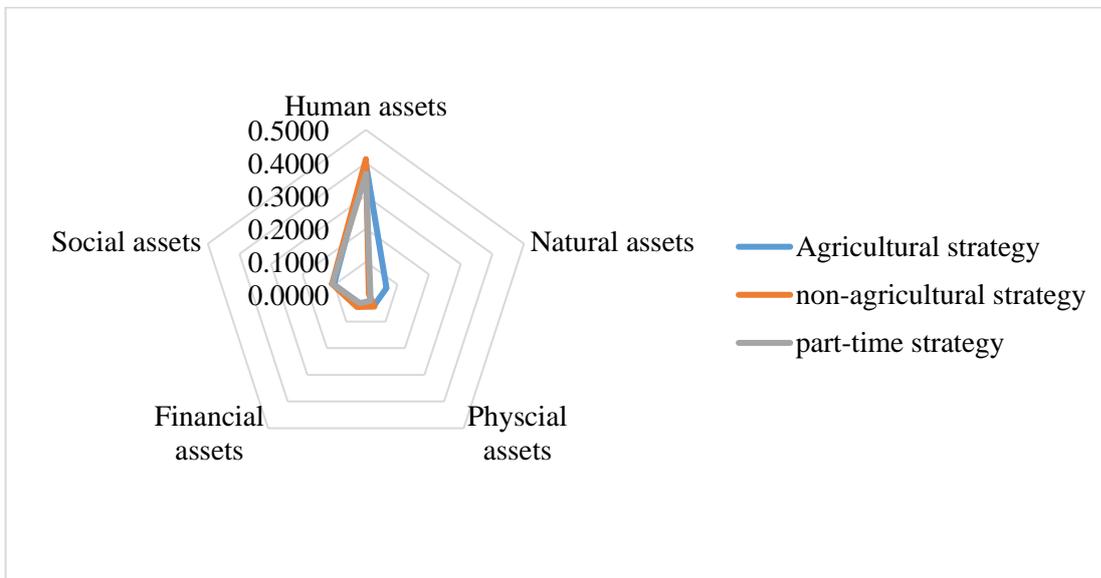


Figure 4. Average livelihood assets indices by livelihood strategy

Tables

Table 1. The indicators of livelihood goals

Classification	Indicators	Description	Citation
Survival goal	Income level	1 if the household's income is under the poverty line, 0 otherwise. The poverty line of China in 2018 is the per-capita net income lower than 2952 yuan per year.	China's National Bureau of Statistics
	Engel coefficient	Engel coefficient is measured by the proportion of food consumption in total expenditure, which reflects the living condition of a family.	Yu (2018)
	Diversification index	The diversification level is calculated by the Simpson index based on the households' different income sources.	Dzanku (2018)
	Self-agriculture consumption rate	Self-agriculture consumption rate reflects the ratio of self-agriculture consumption to self-agriculture production.	Huang et al. (2021a)
Security goal	Land assets	The total value of the land. (Unit: 100,000 yuan)	Xu & Du (2022)
	Agricultural production fixed assets	The proportion of the agricultural productive fixed assets such as seeds and ploughs. (Unit: 10,000 yuan)	Zhang et al. (2019)
	Durable assets	The proportion of non-agricultural fixed assets such as TV, fridge, car. (Unit: 100,000 yuan)	Zhang et al. (2019)
	Saving	The total savings of a household. (Unit: 100,000 yuan)	Dzanku (2018)
	House assets	The total value of house of a household. (Unit: 1,000,000 yuan)	Zhang et al. (2019)
	Organisation	1 if a household joins in the formal or informal organisation, 0 otherwise.	Tambe (2022)

Self-respect goal	Social spending	The money is spent mainly for important social events during the year, such as the marriage of relatives. (Unit: 10,000 yuan)	Hua et al. (2017)
	Finance assets	The total value of finance products, including bonds, stocks, and funds. (Unit: 100,000 yuan)	Plagnol (2011)
	Average education level	The average education level represents the average education year of a household.	Hua et al. (2017)
	Business assets	The market value of all business assets equals the value of property and intangibles minus the value of liabilities (net value concept) (Unit: 10,000 yuan)	Arrondel et al. (2014)

Source: Author's configuration based on the literature review.

Table 2. The selected indicators of livelihood goals after Principal Component Analysis

Classification	Indicators	Mean	Std. Dev.	Loading value after rotation
Survival goal	Income level	0.049	0.215	0.618
	Engel coefficient	0.165	0.105	0.792
	Diversification index	0.346	0.224	0.560
	Self-agriculture consumption rate	0.334	0.395	0.655
Security goal	Land assets	0.342	0.923	0.669
	Durable assets	0.261	0.560	0.596
	Fixed agricultural production assets	0.354	1.853	0.711
	House assets	0.241	0.387	0.597
Self-respect goal	Saving	0.260	0.508	0.537
	Education level	5.530	3.197	0.599
	Organization participation	0.272	0.524	0.782
	Social status	4.032	0.996	0.950
	Finance assets	0.075	0.315	0.626
	Business assets	0.606	3.171	0.600

Only factors with a principal component load coefficient with an absolute value greater than 0.5 are listed here.

Table 3. Marginal effects of livelihood goals' indicators of livelihood strategy

Variables	Multi-logit model			Multi-probit model		
	Agricultural strategy	Non-agricultural strategy	Concurrent business strategy	Agricultural strategy	Non-agricultural strategy	Concurrent business strategy
Income level	-0.017 (-1.310)	-0.317*** (-8.994)	0.334*** (9.949)	-0.020 (-1.642)	-0.311*** (-9.233)	0.331*** (10.245)
Diversification index	-0.076*** (-8.833)	-0.444*** (-15.545)	0.520*** (18.509)	-0.076*** (-9.311)	-0.449*** (-16.140)	0.524*** (19.231)
Self-agriculture consumption rate	-0.145*** (-6.913)	0.096*** (4.650)	0.049** (2.523)	-0.136*** (-6.825)	0.093*** (4.578)	0.042** (2.292)
Land assets	0.016*** (4.901)	-0.088*** (-5.250)	0.072*** (4.576)	0.016*** (5.826)	-0.079*** (-4.797)	0.062*** (4.141)
House assets	-0.054*** (-3.706)	0.032* (1.678)	0.023 (1.235)	-0.054*** (-3.993)	0.030* (1.683)	0.024 (1.364)
Education level	-0.003** (-2.515)	0.018*** (6.320)	-0.015*** (-5.339)	-0.003*** (-2.628)	0.019*** (6.650)	-0.016*** (-5.676)
Business assets	-0.007*** (-2.896)	0.015*** (4.231)	-0.008** (-2.382)	-0.006*** (-3.047)	0.014*** (4.507)	-0.007*** (-2.602)
Control variables		Controlled			Controlled	
Lagged LS		Controlled			Controlled	
Regional effects		Controlled			Controlled	
Pseudo R^2		0.342			--	
Log-likelihood ratio		-2159.212			-2156.822	
Wald test		Wald chi2(58) = 1342.55			Wald chi2(58) = 1518.91	
Prob > chi2		P = 0.000			P = 0.000	
Observations		4232			4232	

Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1.

Only significant factors for both models are listed here. Engel coefficient of survival goal, durable assets, agricultural production fixed assets, savings of security goal, organisation participation, social spending, social status, and financial assets of self-respect goal are insignificant in households' LS selection.

Table 4. Marginal effects of livelihood goals of livelihood strategy

Variables	Multi-logit model			Multi-probit model		
	Agricultural strategy	Non-agricultural strategy	Concurrent business strategy	Agricultural strategy	Non-agricultural strategy	Concurrent business strategy
Survival goal	-0.406** (-2.310)	-0.127 (-1.261)	0.533*** (5.829)	-0.205** (-2.064)	-0.233*** (-3.762)	0.438*** (6.976)
Security goal	0.083*** (3.000)	-0.312** (-2.521)	0.229* (1.885)	0.083*** (2.762)	-0.317*** (-2.631)	0.234** (1.977)
Self-respect goal	0.002 (0.086)	0.289*** (3.629)	-0.290*** (-3.429)	-0.001 (-0.060)	0.270*** (3.913)	-0.269*** (-3.746)
Control variables			Controlled			Controlled
Lagged LS			Controlled			Controlled
Regional effects			Controlled			Controlled
Pseudo R^2			0.309			--
Log-likelihood ratio			-2270.264			-2270.841
Wald test			Wald chi2(52) = 1189.93			Wald chi2(52) = 1346.16
Prob > chi2			P = 0.000			P = 0.000
Observations			4232			4232

Robust standard errors in parentheses; *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.